REMARKS

This responds to the Final Office Action mailed on May 13, 2008. Reconsideration is respectfully requested.

Claims 1 and 15 have been amended, no claims are canceled, and no claims are added; as a result, claims 1 – 30 are pending in this application.

Allowable Subject Matter

Claims 15-21 were allowed. Claim 15 has been amended to correct a typographical error.

Claims 6 and 26 were objected to as being dependent upon a rejected base claim, but were indicated to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The objection of claims 6 and 26 is believed to have been overcome because the rejected base claim is believed to be allowable, as discussed below.

§103 Rejection of the Claims

Claims 1-5, 22 and 28-30 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Kim (U.S. 2003/0063558 A1) in view of Peeters et al. (U.S. 6,628,738 B1) and further in view of Wright et al. (U.S. 5,990,738).

Claim 1 has been amended to clarify that the recursively filtering includes generating a predicted observation vector from a phase compensation estimate, that the phase compensation estimate is generated for a prior data symbol using a recursive algorithm, and that the recursively filtering includes subtracting the predicted observation vector from the observation vector.

Wright has been cited for disclosing "wherein the recursive filtering includes generating a predicted observation vector from a phase compensation estimate generated for a prior data symbol using a recursive algorithm, and subtracting the predicted observation vector from the observation vector". Applicant respectfully disagrees with this interpretation of Wright.

According to the Examiner, Applicant's predicted observation vector and Applicant's observation vector of claim 1 correspond to Wright's predicted waveform 144 and Wright's real observed signal 18 (illustrated Wright FIG. 14 and described at column 23 line 48 through column 24 line 4). Wright's signals 18 and 144, however, are generated by the amplification of

waveforms 141 and 142 by LINC amplifier 20. Waveforms 141 and 142 comprise a decomposed baseband signal and when they are combined by LINC amplifier 20, the original signal must result (see Wright column 13 lines 17 – 26 and column 14 lines 60 – 67). Applicant's observation vector and Applicant's predicted observation vector, when combined, could not have this special property due to the way they are generated as recited in claim 1.

As recited in Applicant's claim 1, the predicted observation vector is generated from a phase compensation estimate, and the phase compensation estimate is generated from a prior data symbol using a recursive algorithm. In Wright, neither the real observed signal 18 nor the predicted waveform 144 are generated from a phase compensation estimate. Note that Wright *requires* that the real observed signal 18 and the predicted waveform 144 be generated from the same special waveforms 141 and 142 (see FIG. 14 and column 23 lines 65- 66).

Furthermore, Wright's signals 18 and 144 are generated ***from the same two signals***, waveforms 141 and 142. The purpose in Wright is to model the LINC amplifier (see Wright column 23 line 65 through column 24 line 4). Applicant's observation vector and Applicant's predicted observation vector are generated from different signals. Applicant's observation vector is generated by weighted pilot subcarriers, as recited in claim 1. Applicant's predicted observation vector is generated from a phase compensation estimate that was generated for a ***prior data symbol*** using a recursive algorithm, as recited in claim 1.

Although Wright subtracts the real observed signal 18 and the predicted waveform 144 in comparator 145 (see Wright FIG. 14 and column 23 lines 53 – 57), and uses a recursive process to identify compensation parameters for a model LINC amplifier 143, this recursive process requires that special sequence waveforms 141 and 142 be related (as discussed above) (see column 23 lines 65 – 67). Without this relation, Wrights process to determine compensation parameters and model the LINC amplifier will fail because a LINC amplifier requires two constant envelope phase varying signals, which when combined, generate the original signal (see Wright Abstract and column 13, lines 17 – 25). Wright simply discloses one of many applications of recursive filtering that is inapplicable to Applicants claim 1.

In view of the above, Applicant submits that Wright does not disclose "wherein the recursive filtering includes generating a predicted observation vector from a phase compensation estimate generated for a prior data symbol using a recursive algorithm, and subtracting the

predicted observation vector from the observation vector"", as recited in Applicant's claim 1. Accordingly the Examiner, both Kim and Peeters fail to disclose "wherein the recursive filtering includes generating a predicted observation vector from a phase compensation estimate generated for a prior data symbol using a recursive algorithm, and subtracting the predicted observation vector from the observation vector". Therefore, the combination of Wright with both Kim and Peeters does not result in Applicant's claim 1. Claim 1 is therefore believed to be allowable.

Claims 2 – 5 are believed to be allowable at least because of their dependency on claim 1. Claims 22 and 28-30 have recitations similar to those of claim 1 and are also believed to be allowable.

Claims 10 and 11 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over Kim, Peeters et al. and Wright et al. and further in view of Komninakis et al. ("Multi-Input Multi-Output Fading Channel Tracking and Equalization Using Kalman Estimation," IEEE 2002). Claims 10 and 11 are believed to be allowable in view of the above discussion of Wright and because of their dependency on claim 1.

Claim 12 was also rejected under 35 U.S.C. § 103(a) as being unpatentable over Kim, Peeters et al., Wright et al., and Komninakis et al., and further in view of Crawford (U.S. 2002/0159533 A1). Claim 12 is believed to be allowable in view of the above discussion of Wright and because of its dependency on claim 1.

Claim 7 was also rejected under 35 U.S.C. § 103(a) as being unpatentable over Kim, Peeters et al., and Wright et al., and further in view of McFarland et al. (U.S. 7,027,530 B2). Claim 7 is believed to be allowable in view of the above discussion of Wright and because of its dependency on claim 1.

Claims 8 and 27 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over Kim, Peeters et al., Wright et al., and McFarland et al., and further in view of Crawford. Claims 8 and 27 are believed to be allowable in view of the above discussion of Wright and because of their dependency on claim 1 or 22.

Claims 9 and 25 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over Kim, Peeters et al., and Wright et al., and further in view of Crawford. Claims 9 and 25 are

believed to be allowable in view of the above discussion of Wright and because of their dependency on claim 1 or 22.

Claims 13 and 14 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over Kim, Peeters et al., and Wright et al., and further in view of Kuwabara et al. (U.S. 2001/0015954 A1) and Crawford. Claims 13 - 14 are believed to be allowable in view of the above discussion of Wright and because of their dependency on claim 1.

Claims 23 and 24 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over Kim, Peeters et al., and Wright et al., and further in view of Perets et al. ("A New Phase and Frequency Offset Estimation Algorithm for OFDM Systems Applying Kaman Filter," Department of Electrical Engineering-Systems, Tel Aviv University, December 2002.) Claims 23 and 24 are believed to be allowable in view of the above discussion of Wright and because of their dependency on claim 22.

Claims 1, 22 and 28 were also rejected under 35 U.S.C. § 103(a) as being unpatentable over Kim in view of Peeters et al., and further in view of Komninakis et al.

Komninakis has been cited for disclosing "wherein the recursive filtering includes generating a predicted observation vector from a phase compensation estimate generated for a prior data symbol using a recursive algorithm, and subtracting the predicted observation vector from the observation vector". Applicant respectfully disagrees with this interpretation of Komninakis. Komninakis discloses only the use of a Kalman filter to track channel variation. Komninakis' Equation 17 is a series of equations that are recursions that implement an optimum linear estimator for the time varying part of the channel (see Komninakis below Equation 17).

Applicant's claim 1, on the other hand, recites the generation of a phase compensation estimate by recursive filtering an observation vector formed by weighted pilot subcarriers. The phase compensation is applied *after* channel equalization (i.e., channel equalized subcarriers of the data symbol).

As recited in Applicant's claim 1, the predicted observation vector is generated from a phase compensation estimate, and the phase compensation estimate is generated from a prior data symbol using a recursive algorithm. This is not taught, suggested or motivated in Komninakis as Komninakis applies a recursive process to channel tracking.

Applicant's observation vector, furthermore, is generated by weighted pilot subcarriers, and Applicant's predicted observation vector is generated from a phase compensation estimate that was generated for a prior data symbol using a recursive algorithm, as recited in claim 1. In Komninakis, there is no use of weighted pilot subcarriers as recited in Applicant's claim 1.

Applicant notes that Komninakis does not generate nor apply any additional phase compensation beyond a channel estimate. The effects of phase noise and frequency variation that cause interference in OFDM systems can be reduced by the application of Applicant's phase compensation estimate. The channel tracking in Komninakis does not address effects of phase noise and frequency variation.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance, and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's representative at (480) 659-3314 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

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